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EXAMINER	
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2609	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

TH

Office Action Summary	Application No.	Applicant(s)	
	10/826,842	MUKERJEE, KUNAL	
	Examiner	**Art Unit**	
	Mia M. Thomas	2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on ____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-21 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5)☐ Claim(s) ____ is/are allowed.

6)☒ Claim(s) 1-21 is/are rejected.

7)☒ Claim(s) 7,10-17 is/are objected to.

8)☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 15 April 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date see attached.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. Claim 14 is objected to because of the following informalities:

A computer-readable storage medium having computer-executable program instructions stored thereon for ~~operative~~ operation, ~~upon execution~~ when executed in a computer media processing system ~~to perform~~ performs a method of encoding image or video data, the method comprising...

Regarding Claim 14, the following will be assumed for examination purposes: "...for operation, when executed in a computer media processing system performs a method of encoding image or video data, the method comprising...

Appropriate correction is required.

Claim Objections - 37 CFR 1.75(a)

2. The following is a quotation of 37 CFR 1.75(a):

> The specification must conclude with a claim particularly failing to point out and distinctly claim the subject matter, which the applicant regards as his invention or discovery.

Claims 7,10-17 are objected to under 37 CFR 1.75(a), as failing to conform to particularly point out and distinctly claim the subject matter which application regards as his invention or discovery.

Regarding Claims 7, 14, and 17 the term "sufficiently close" is considered narrow language and is a relative term, which renders the claim indefinite in accordance with the interpretation of the claimed subject matter. The term "sufficiently" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the

scope of the invention. How close is "sufficiently close?" Without a firm grasp of what constitutes "sufficiently close", one cannot determine when or when not to apply a "DPMC", e.g. as recited in claim 7. Those of ordinary skill in the art may well reasonably disagree on the degree of "sufficiency". Correction or clarification on the record is required.

Claims 10-17 are objected to under 37 CFR 1.75(a) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery. **Regarding claims 10-17,** a "system" is recited in the preamble, without reciting structure in the body of the claims. It is uncertain as to which statutory category these claims are drawn to: process, machine, or product? A computer-implemented product will be assumed for examination purposed, given that the claims appear to be drawn to a system of computer software.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs, which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.
>
> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a

> computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).
>
> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 10-17 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 10-17 defines a "media system providing predictive lossless coding of image or video media content" embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed "media system providing predictive lossless coding of image or video media content" can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium" or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3-10, 12-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Hirabayashi et al. (US 6,101,282).

Regarding Claim 1, Hirabayashi teaches a method for lossless coding of image and video media, ("reversible encoding" at column 1, line 12; "...an object of the present invention is to enable encoding with an optimum encoding method in an optimum encoding unit, according to the property of the image." at column 2, line 3); comprising: splitting input image data into block portions ("...division means for dividing an image into plural encoding target blocks..." at column 2, line 7,e.g. Figure 11, numeral 111, Figure 6); for an individual one of the block portions, ("...for use in each of the encoding target blocks divided by said division means;..." at column 2, line 10).; selecting one of multiple available differential pulse code modulation (DPCM) prediction modes(" There are provided nine encoding methods in total, in which six methods #0-#5 are prediction encoding methods in which the difference (prediction error) from the surrounding

pixels is encoded..." at column 3, line 40) to apply to the block portion that out of the available DPCM prediction modes yields a closer to optimal symbol distribution of an entropy encoder, ("...selection means for selecting one of plural encoding modes... prepared in advance, for use in each of the encoding target blocks divided by said division means..." at column 2, line 9); applying the selected DPCM prediction mode to the block portion; ("...encoding means for encoding each encoding target block with the encoding mode selected by said selection means..." at column 2, line 13) and entropy encoding DPCM residuals of the block portion ("There are provided nine encoding methods in total, in which six methods #0-#5 are prediction encoding methods in which the difference (prediction error) from the surrounding pixels is encoded..." at column 3, line 40).

Regarding Claim 3, Hirabayashi teaches the entropy encoding is run-length, Golomb-Rice coding ("Also the prediction encoding...and run-length encoding are made selectable for the encoding of the blocks...but other entropy encoding methods such as Golomb-Rice encoding or arithmetic encoding may also be employed." At column 8, line 46).

Regarding Claim 4, Hirabayashi teaches encoding the DPCM prediction mode selected for the block portion using run-length, Golomb-Rice coding ("Also in the first embodiment, the encoding target block is determined by the block division, based on the amount of codes of a square block as shown in Figure 6 and the total amount of the codes of four sub blocks...Also the prediction encoding and run length encoding...can be employed by Golomb-Rice encoding..." at column 8, line 21).

Regarding Claim 5, Hirabayashi teaches encoding the DPCM prediction mode and DPCM residuals with separate run-length, Golomb-Rice coding contexts ("Also the encoding may be conducted, instead of the difference between the pixels, on the run-lengths of the pixel values." at column 10, line 12).

Regarding Claim 6, Hirabayashi teaches determining whether application of the selected DPCM prediction mode to the block portion produces all zero valued DPCM residuals; ("Then transmitted are data of a complete approximation flag, which indicates whether the prediction errors e_k for the pixels within the encoding target block are all zero." at column 4, line 54), and encoding an indication that the block portion is flat instead of entropy encoding DPCM residuals of the block portion (Figure 11, numeral 107; "The frequency counter 107 counts the frequency of occurrences of the value from −255 to 255, the frequencies being initially set to zero..." at column 9, line 7).

Regarding Claim 7, Hirabayashi teaches selecting the DPCM prediction mode comprises ("...selection means for selecting one of plural encoding modes, ..." at column 2, line 9): determining whether the DPCM prediction mode yielding the closer to optimal symbol distribution for entropy coding is sufficiently close to the optimal symbol distribution for entropy coding ("Another object of the present invention is to enable more efficient encoding...in the encoding in the unit of a block." at column 2, line 19); and if not sufficiently close, applying no DPCM to the macro-block before the entropy encoding ("If all zero, flag is turned on...and the data is terminated. If not, the flag is turned off...and then transmitted are the data..." at column 4, line 56).

Regarding Claim 8, Hirabayashi teaches the DPCM prediction modes comprise modes designed to produce an optimal distribution for entropy coding for block

portions ("More specifically there are transmitted a Huffman code indicating the use of the "plane approximation code #6 for the encoding target block...then transmitted are data of a complete approximation flag...which indicates whether the predication errors for the pixels within the encoding target blocks are all zero." at column 4, line 49), whose image content is predominantly a horizontal major edge, a vertical major edge, ramp diagonal edges, bands, and banded horizontal ramps ("The encoded data normally assumes structures as shown in Figures 4a to 4d." at column4, line 47, e.g. Figure 3a and Figure 7).

Regarding Claim 9, Hirabayashi teaches the DPCM prediction modes comprise: a first mode in which a pixel's value is subtracted from its left neighboring pixel; a second mode in which a pixel's value is subtracted from its top neighboring pixel; a third mode in which a pixel's value is subtracted from a minimum or maximum of its left and top neighboring pixels; a fourth mode in which a pixel's value is subtracted from an average of its top and top right neighboring pixels; a fifth mode in which a pixel's value is subtracted from its top-left neighboring pixel; a sixth mode in which the difference between a pixel's top and top-left neighboring pixels is subtracted from its left neighboring pixel; and a seventh mode in which a pixel's value is subtracted from an average of the pixel's left and top neighboring pixels (The modes claimed are described in details in Figure 3a and 3b; The encoding method #6, "plane approximation mode" is explained in detail at column 3, line 55, the encoding method #7, "uniform mode" is explained in detail at column 5, line 11, and the encoding method #8, "binary mode" is explained in detail at column 5, line 22).

Regarding Claim 10, Hirabayashi teaches a media system providing predictive lossless coding of image or video media content, the system comprising ("Figure 11 is a block diagram of an encoding apparatus..." at column 8, line 59): a macro block division process for separating input image data into macro blocks ("The block cut out circuit 111 reads and stores the image data...in the unit of a block of 8x8 pixels." at column 9, line 14); a multi-mode differential pulse code modulation (DPCM), ("There are provided nine encoding methods in total..." at column 3, line 41; e.g. Figure 11, numeral 102 and numeral 103) process operating on an individual macro block of the input image data ("...plural encoding methods available for each block unit of the image in the present embodiment." at column 3, line 28); to choose one of multiple DPCM prediction modes (Figure 11, numeral 108) that produces a residual distribution for the macro block to more closely match an optimal run-length, Golomb-Rice (RLGR) entropy coding distribution, ("Still another object of the present invention is, in encoding the target data by switching the encoding method for each of the block units, to effect entropy encoding according to each of the encoding methods to be used for each block unit." at column 2, line 22); and applies the chosen DPCM prediction mode to the macro block; ("The selector 108 releases the difference data train stored in the buffer...if the output of the code amount comparator 105 is "0" or "1",at column 9, line 45, also Figure 14, step 410); and an entropy coding process for performing a run-length, Golomb-Rice coding of the DPCM residuals of the macro block ("Also, the encoding may be conducted, instead of the difference between the pixels, on the run-lengths of the pixel values." at column 10, line 12).

Regarding Claim 12, Hirabayashi teaches the DPCM prediction modes comprise modes designed to produce distributions close to the optimal RLGR entropy coding distribution for macro-blocks (Figure 3a and 3b and Figure 7) whose image content is predominantly a horizontal major edge, a vertical major edge, ramp diagonal edges, bands, and banded horizontal ramps ("...the selection of the block size is conducted for each of such sub blocks, in place of the above-mentioned square block." at column 6, line 44, (e.g. Figure 7)).

Regarding Claim 13, Hirabayashi teaches the media system of claim 10 wherein the DPCM prediction modes comprise ("The above mentioned object can be attained, according to a preferred embodiment of the present invention, by an image processing apparatus comprising..." at column 2, line 3; e.g. Figure 1; "Figure 11 is a block diagram of an encoding apparatus constituting a second embodiment of the present invention, wherein shown are an image input device 100; ...a Huffman encoding unit 109; and a code generator 110." at column 8, line 59) : a first mode in which a pixel's value is subtracted from its left neighboring pixel; a second mode in which a pixel's value is subtracted from its top neighboring pixel; a third mode in which a pixel's value is subtracted from a minimum or maximum of its left and top neighboring pixels; a fourth mode in which a pixel's value is subtracted from an average of its top and top right neighboring pixels; a fifth mode in which a pixel's value is subtracted from its top-left neighboring pixel; a sixth mode in which the difference between a pixel's top and top-left neighboring pixels is subtracted from its left neighboring pixel; and a seventh mode in which a pixel's value is subtracted from an average of the pixel's left and top neighboring pixels (The modes mentioned are described in Figure 3a and 3b; The

encoding method #6, “plane approximation mode” is explained in detail at column 3, line 55, the encoding method #7, “uniform mode” is explained in detail at column 5, line 11, and the encoding method #8, “binary mode” is explained in detail at column 5, line 22).

Regarding Claim 14, Hirabayashi teaches a computer-readable storage medium having computer-executable program instructions stored thereon for operation, when executed in a computer media processing system performs (Figure 1, numeral 1; “Figure 1 shows the circuit structures for encoding and decoding an image, wherein provided are a CPU control unit 1 capable of encoding and decoding of the image data by a software process; ...” at column 3, line 6); a method of encoding image or video data, the method comprising... (“...an object of the present invention is to enable encoding with an optimum encoding method in an optimum encoding unit, according to the property of the image.” at column 2, line 3), the method comprising: converting image data to a YCoCg color space format; (“Also the present embodiment has been explained in case of processing an 8-bit multi-value monochromatic image, but it is applicable also to a binary image or to a color image.” at column10, line 20); splitting the image data into macro-blocks; (Figure 6) for a macro-block of the image data (Figure 7), determining which from a group of available DPCM prediction modes produces residuals closest to an optimal distribution for RLGR coding (“...in encoding the target data by switching the encoding method for each of the block units, to effect entropy encoding according to each of the encoding methods to be used for each block unit.” at column 2, line 22);; if such determined DPCM prediction mode produces residuals whose distribution is sufficiently close to the optimal distribution, applying the DPCM prediction mode to the

macro-block ("The selector 108 releases the difference data train stored in the buffer...if the output of the code amount comparator 105 is "0" or "1",at column 9, line 45); and RLGR entropy encoding the residuals of the macro-block ("Also, the encoding may be conducted, instead of the difference between the pixels, on the run-lengths of the pixel values." at column 10, line 12).

Regarding Claim 15, Hirabayashi teaches the computer-readable storage medium of claim 14 wherein the method further comprises (Figure 1, numeral 1; "Figure 1 shows the circuit structures for encoding and decoding an image, wherein provided are a CPU control unit 1 capable of encoding and decoding of the image data by a software process; ..." at column 3, line 6); determining whether application of the determined DPCM prediction mode to the macro-block produces flat residuals (Figure 11, numeral 107); and if so, encoding the macro-block as a flat macro-block mode indication without the RLGR entropy encoding the residuals of such flat macro-block (Figure 11, numeral 109 and 110).

Regarding Claim 16, Hirabayashi teaches the computer-readable storage medium further comprising (Figure 1, numeral 1): RLGR entropy encoding the macro-block mode indication using a separate RLGR coding context than for RLGR entropy encoding the residuals ("The image is scanned as shown in Figure 5a, under the assumption that the first pixel has a value D1, and the run lengths of D1 and D2, occurring alternatively, are encoded." at column 5, line 24).

Regarding Claim 17, Hirabayashi teaches the computer-readable storage medium of claim 15 wherein the method further comprises (Figure 1, numeral 1): determining whether the DPCM prediction mode producing a residual distribution closest to the

optimal distribution produces a residual distribution sufficiently close to the optimal distribution ("... is to enable more efficient encoding...in the encoding in the unit of a block." at column 2, line 19); and if not sufficiently close, RLGR entropy encoding the macro-block without applying the DPCM prediction mode to the macro-block ("If all zero, flag is turned on...and the data is terminated. If not, the flag is turned off...and then transmitted are the data..." at column 4, line 56).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2, 11, 18, 19, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirabayashi et al. (US 6101282) in combination with Irvine et al. (US 2003/0039396 A1).

Hirabayashi et al. (US 6101282) teaches the elements claims 1, 3-10, 12-17 in the U.S.C. 102 (b) rejection above. Hirabayashi does not teach converting the input image data into a YCoCg color space format; a color space conversion process for converting the input image data prior to a YCoCg color space format prior to coding; decoding predictive losslessly coded data of an image or video; RLGR entropy decoding a macro-block mode, a DPCM prediction mode and DPCM residuals for each of a plurality of macro-blocks using separate RLGR coding contexts; where the macro-block mode of a macro-block is a flat macro-block mode, decoding the macro-block's pixels using a DPCM

demodulation that is an inverse of the RLGR-decoded DPCM prediction mode of all zero residuals; otherwise, where the DPCM prediction mode of the macro-block is a no DPCM prediction mode, decoding the macro-block's pixels without DPCM demodulation; otherwise, de-modulating the RLGR-decoded DPCM residuals using a DPCM demodulation that is an inverse of the RLGR-decoded DPCM prediction mode; and assembling the macro-blocks to form a decoded image data; converting the decoded image data from a YCoCg color space format to a displayable color space format. Hirabayashi also does not teach a predictive-lossless coded image or video decoder, comprising: a run-length Golomb-Rice (RLGR) entropy decoder operating to decode RLGR-encoded DPCM residuals and DPCM prediction mode of a macro-block; a DPCM demodulator for applying an inverse of the DPCM prediction mode to the DPCM residuals; and a macro-block reassembler for assembling the macro-block with other decoded macro-blocks to form data of a reconstructed image or an inverse YCoCg converter for converting the reconstructed image from a YCoCg color space to a color space suited for displaying the image.

Irvine (US 2003/0039396 A1) in the same field of predictive lossless coding for image or video data teaches:

Regarding Claim 2, Irvine teaches converting the input image data into a YCoCg color space format ("A color signal may be converted from RGB space to YC1C2 space using a RGB to YC1C2 converter 116..." at paragraph [0051]).

Regarding Claim 11, Irvine teaches a color space conversion process for converting the input image data prior to a YCoCg color space format prior to coding ("A color signal may be converted from RGB space to YC1C2 space using a RGB to YC1C2 converter

116...", However sub-sampling is not necessary...in some applications of processing..." at paragraph [0051]).

Regarding Claim 18, Irvine teaches decoding predictive losslessly coded data of an image or video, comprising ("Figure 1 shows the circuit structure for encoding and decoding an image..."at column 3, line 6): RLGR entropy decoding a macro-block mode, (Figure 11, numeral 1112, "...on a block by block basis..." at paragraph [0100]); a DPCM prediction mode and DPCM residuals for each of a plurality of macro-blocks using separate RLGR coding contexts ("In an alternative embodiment the subtractor 966 compares on a block by block basis." At paragraph [0100]); where the macro-block mode of a macro-block is a flat macro-block mode, decoding the macro-block's pixels using a DPCM demodulation that is an inverse of the RLGR-decoded DPCM prediction mode of all zero residuals;(Figure 11, numeral 1104 and numeral 1108") otherwise, where the DPCM prediction mode of the macro-block is a no DPCM prediction mode, decoding the macro-block's pixels without DPCM demodulation (Figure 11, object "B" and object "D" numeral 1132 and numeral 1164); otherwise, de-modulating the RLGR-decoded DPCM residuals using a DPCM demodulation that is an inverse of the RLGR-decoded DPCM prediction mode; and assembling the macro-blocks to form a decoded image data (Figure 11, numeral 1120 and numeral 1160).

Regarding Claim 19, Irvine teaches converting the decoded image data from a YCoCg color space format to a displayable color space format ("A color transformer 1140 converts this back to the RGB form for final output." at paragraph [0102] e.g. Figure 11, numeral 1140).

Regarding Claim 20, Irvine teaches predictive-lossless coded image or video decoder ("Figure 11 illustrates a lossless decoder 1100, which operates in an equal but opposite manner as described with the encoder of Figure 9." at paragraph [0101]; (Figure 11 numeral 1112 and numeral 1144); comprising: a run-length Golomb-Rice (RLGR) entropy decoder (Figure 11, numeral 1112, 1132, 1144, 1164) operating to decode RLGR-encoded DPCM residuals ("In Figure 11... B represents inter-frame residual lossy compressed encoded data..." at paragraph [0101]) and DPCM prediction mode of a macro block ("In an alternative embodiment the subtractor 966 compares on a block by block basis." At paragraph [0100]); a DPCM demodulator for applying an inverse of the DPCM prediction mode to the DPCM residuals; ("The residual pixels are generated by first decompressing the compressed data using the ABSDCT decoder, and then subtracting it from the original data." at paragraph [0096]; "More specifically, the DC coefficients 1104 are transferred to a Golomb-Rice decoder 1112, which reverses the function of the Golomb-Rice encoder and transfers the output to an inverse DC differential pulse code modulator 1116." at paragraph [0101]); and a macro block reassembler for assembling the macro block with other decoded macro blocks to form data of a reconstructed image ("The final compressed output then corresponds to the one that uses the minimum number of bits per frame." at paragraph [0097]; "The output of the variable length decoder 168 is provided to an inverse serializer 172 that orders the coefficients according to the scan scheme employed." at paragraph [106]).

Regarding Claim 21, Irvine teaches the predictive-lossless coded image or video decoder of claim 20 ("Figure 11 illustrates a lossless decoder 1100, which operates in an equal but opposite manner as described with the encoder of Figure 9." at paragraph

[0101].), comprising: an inverse YCoCg converter for converting the reconstructed image from a YCoCg color space to a color space suited for displaying the image ("The pixel data may then have to be interpolated, converted to RGB form, and then stored for future display." at paragraph [0108]).

At the time that the invention was made, it would have been obvious to add the RGB to YC1C2 converter as taught by Irvine to the method and system of predictive lossless coding as taught by Hirabayashi. The addition of the RGB to YC1C2 color converter creates a larger range of processing and lossless coding and decoding for a variety of images in image data and video media. It would have also been advantageous to add the RGB to YC1C2 color converter prior to color conversion processing of image data or video media as taught by Irvine to the method and system of predictive lossless coding as taught by Hirabayashi to decrease the residuals before the encoder or decoder as taught by Irvine moves toward multiple DPMC modes.

At the time that the invention was made, it would have been obvious to add a method of predictive lossless decoding and a predictive lossless decoder as taught by Irvine to the method and system of predictive lossless coding as taught by Hirabayashi. The addition of the predictive lossless decoder as taught by Irvine to the predictive lossless coding as taught by Hirabayashi would allow the overall coding and decoding process to be more efficiently performed if both methods and apparatus' resided on one system and in or on one computer readable medium with software instructions thereon. The advantage of having a predictive lossless decoder added with the predictive lossless encoder is that the lossless decoder operates in an equal but opposite manner as the encoder. The combination of the lossless decoder and lossless encoder would provide financial

support to any budget constraints or material usage in the manufacturing of this product.

It would have also been obvious to add the predictive lossless decoder as taught by Irvine to the computer readable medium with computer executable instructions as taught by Hirabayashi to create more efficient forms of calculation and computation of the various values of the image and video data run on the central processing unit. The application of the software would also be more attractive to a potential consumer for compact execution of the software instructions.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1.	Nakayama et al.	US 6,711,295 B2
2.	Smirnov	US 7,016547 B1
3.	Lei	US 6,272,180 B1

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mia M. Thomas whose telephone number is 571-270-1583. The examiner can normally be reached on Monday-Friday 7:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Werner can be reached on 571-272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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